

Shatter bruise and storage relationship

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Major injuries that happen to potatoes at harvest include cuts, shatter bruises and blackspot bruises. Cuts are usually obvious to the eye and blackspot bruises are mostly undetectable unless peeled. Some shatter bruises are easy to see, while others are not as obvious. The consequences of shatter bruise on overall potato quality are numerous. The first major detriment to quality is that a shatter bruise is an entry point for pathogen invasion, especially the pathogens that cause Fusarium dry rot and Pythium leak, which need a wound to infect (Photo 1). Both of these are significant diseases to manage in storage. Secondly, a shatter bruise is also an exit point for water. There is a tremendous loss of water through a shatter bruise until wound healing is complete. It can take days to weeks to heal a severe shatter bruise, and during that time additional shrinkage is occurring. This extra water loss can make the potato more prone to pressure bruise. And lastly, a major quality detriment of a shatter bruise is the defect itself that degrades visual appearance that can provide a reason for rejection or downgrade of the crop.

Quantifying shatter bruise during harvest will provide time to make modifications to harvest equipment and handling conditions, and to identify lots or fields that have a greater degree of shatter bruising. A high level of shatter bruise will demand more intensive storage management to promote wound healing, minimize disease development, and avoid higher weight loss and pressure bruise potential. Setting up a detection program at harvest can help in quickly identifying the level of shatter bruise of the incoming crop.

A relatively easy way to detect shatter bruises is using an iodine solution. Iodine interacts with starch to form a blue color. Any break in the skin of the potato, such as a shatter bruise, will expose the starch in the tissue to the iodine solution, which will turn a blue/black color (Photo 2). This coloration makes it much easier to determine the number and severity of the shatter bruises. Commercial iodine solutions (typically a 5-10% iodine concentration) can be found at any farm/ranch store in the livestock department. These solutions are considered safe and generally used to prevent infection of wounds on livestock.

The procedure is simple, but takes some setup to get ready. Sample 15-30 potatoes from each location of interest, place in mesh bag, and tag. Potatoes should be washed before soaking in the diluted iodine solution. Washing will help to keep the iodine solution clean and allow the shatter bruises to color more readily. Set up two garbage cans- one to wash/rinse mesh bagged potatoes and the second can to use for the diluted iodine solution. The iodine solution is mixed with water to produce various concentrations and the ratio will determine how much time tubers need to soak to discolor shatter bruises. A 1:1 ratio (iodine solution: water) may take 30 min to color, whereas a more dilute solution of 1:9 ratio may take 1 hour. Soak the sample bags in the diluted iodine solution for the appropriate amount of time. After soaking, rinse potatoes with water and then evaluate and/or count the number of shatter bruises per potato or sample. Potatoes do not

need to be peeled to see the shatter bruise colored blue. It is recommended to use gloves and dispose of the solution as you would other pesticides. The iodine solution can be reused if kept clean and covered. Tubers that have been soaked in the solution should be discarded.

An important key to maintaining potato quality in storage is minimizing shatter bruising at harvest. There are many factors involved in shatter bruise development- cultivar susceptibility, low pulp temperatures, high potato turgidity or hydration, and the impact force. Having knowledge of the crops' shatter bruise level can give you time to alter conditions or equipment to reduce bruising and to manage storage conditions to mitigate quality issues.

Photo 1. Fusarium dry rot development due to a shatter bruise.



Photo 2. Potatoes soaked in a diluted iodine solution. Shatter bruises are colored black/blue and easy to see.

